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Title: SAFETY VALVE DEVICE OF ORGANIC ELECTROLYTE BATTERY

Abstract:

[Purpose] To provide an organic electrolyte battery, which includes a safety valve device having good pressure responsiveness and has an excellent leak resistance characteristic.

[Constitution] An organic electrolyte battery including an outer casing can also serving as a terminal with one polarity and incorporated with a power generation element, a metal sealing lid conductively fixed to the outer casing can to close an opening part of the outer casing can, and a hollow rivet as a terminal with the other polarity disposed through an insulating member is provided with a safety valve device formed by ultrasonic-welding a metal thin plate for explosion protection to a seat of the hollow rivet to block up a rivet hole.

[Explanation of figures]

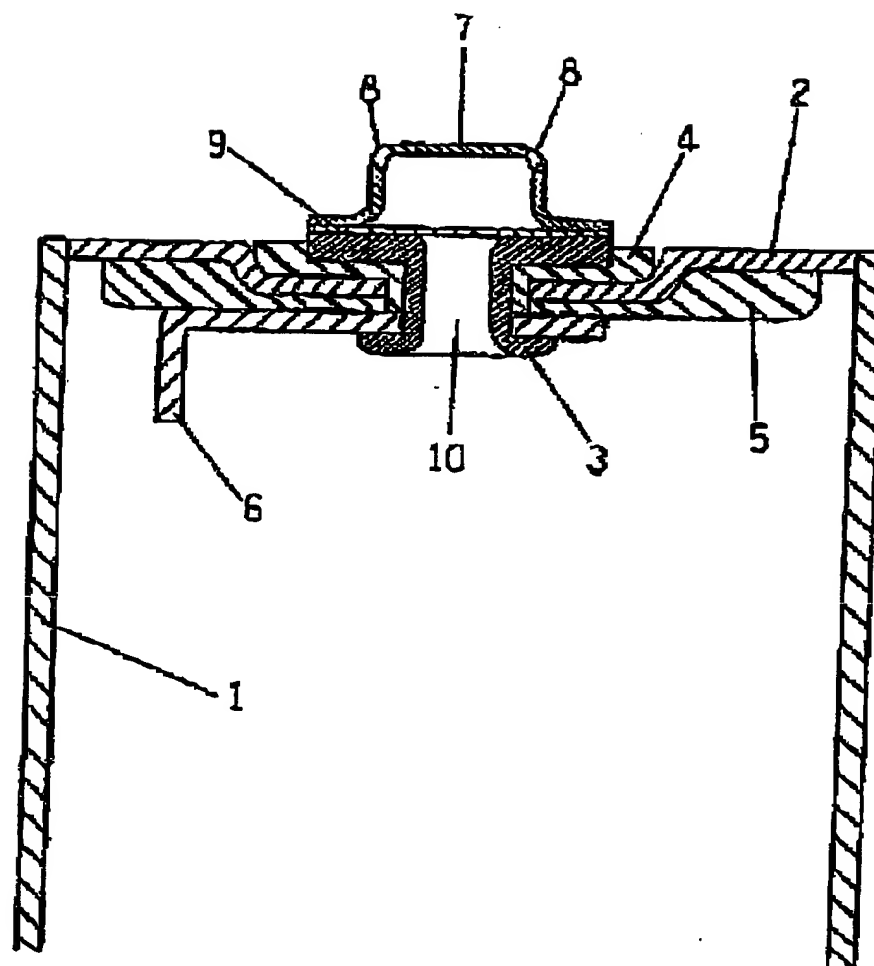
Fig. 1 is a sectional view of the principal part of an organic electrolyte battery according to an embodiment of the

invention.

[Explanation of sign in Fig.1]

1: outer casing can 2: metal sealing lid 3: hollow rivet 4: upper insulating packing 5: lower insulating packing 6: current collecting washer 7: terminal cap 8: gas vent hole 9: metal thin plate for explosion protection formed of aluminum foil with a thickness of 20 μm 10: through hole

[Fig. 1]



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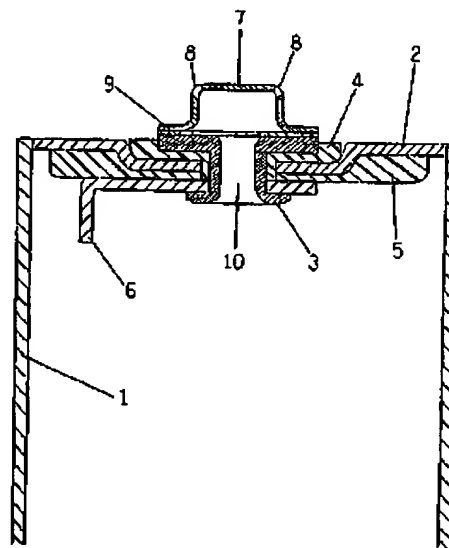
日本電池株式会社内

(54)【考案の名称】 有機電解液電池の安全弁装置

(57)【要約】

【目的】圧力応答性の良好な安全弁装置を具備し、かつ、耐リーク特性に優れた有機電解液電池を得ること。

【構成】発電要素を内蔵せる一極性端子兼用の外装缶と、外装缶に導電的に固着され外装缶の開口部を閉塞する金属封口蓋と、絶縁部材を介して配置される他極性端子の中空リベットを付設する有機電解液電池において、該中空リベットの座に防爆用金属薄板を超音波により溶接してリベット穴を閉塞してなる安全弁装置を備える。



(2)

実開平5-84025

1

2

【実用新案登録請求の範囲】

【請求項1】 発電要素を内蔵せる一極性端子兼用の外装缶と、該外装缶に導電的に固着され外装缶の開口部を閉塞する金属封口蓋と、絶縁部材を介して配置される他極性端子の中空リベットを付設する有機電解液電池であって、該中空リベットの座に防爆用金属薄板を接着してリベット穴を閉塞することを特徴とする有機電解液電池の安全弁装置。

【請求項2】 請求項1記載の有機電解液電池の安全弁装置であって、防爆用金属薄板を超音波溶接にて締着することを特徴とする有機電解液電池の安全弁装置。

【図面の簡単な説明】

【図1】 本考案の実施例に有機電解液電池の要部断面図。

【図2】 従来の有機電解液電池の要部断面図。

【図3】 従来の有機電解液電池の要部断面図。

【図4】 従来の有機電解液電池の要部断面図。

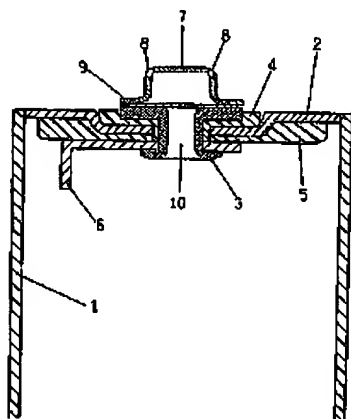
【符号の説明】

- 1 外装缶
- 2 金属封口蓋
- 3 中空リベット
- 4 上部絶縁バックリング
- 5 下部絶縁バックリング

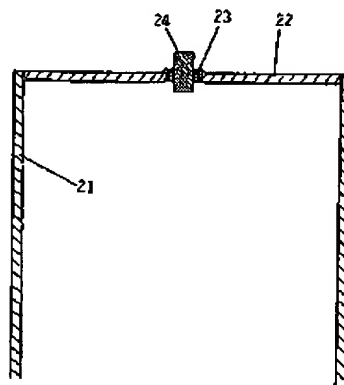
- * 6 集電用ワッシャ
- 7 端子キャップ
- 8 ガス抜き孔
- 9 厚み20 μ mのアルミ箔からなる防爆用金属薄板
- 10 貫通口
- 21 外装缶
- 22 金属封口蓋
- 23 ガラスまたはセラミックシールなどの絶縁部材
- 24 端子ピン
- 31 外装缶
- 32 薄肉部
- 41 外装缶
- 42 金属封口蓋
- 43 中空リベット
- 44 絶縁バックリング
- 45 絶縁バックリング
- 46 集電用ワッシャ
- 47 端子キャップ
- 48 ガス抜き孔
- 49 ゴム弁体
- 50 貫通口
- 51 蓋体

*

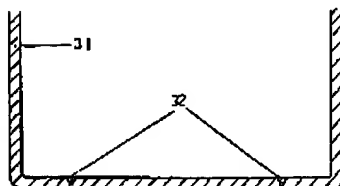
【図1】



【図2】



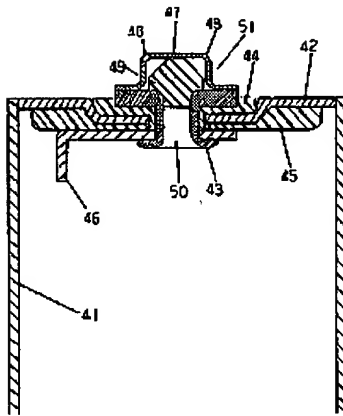
【図3】



(3)

実開平5-84025

【図4】



(4)

実開平5-84025

【考案の詳細な説明】

【0001】

【産業上の利用分野】

本発明はポータブル機器の駆動用電源としての角型有機電解液電池に関するものであり、特に、短絡や過充放電時等における電池内圧上昇や電池温度上昇時等に対する防爆、安全構造に関するものである。

【0002】

【従来の技術】

近年、ラップトップコンピューター、ワープロ等の携帯情報機器、カメラ一体型VTR、液晶テレビ等のAV機器や携帯電話等の移動通信機器等々のように、電源としての電池に対し大電流、大出力を要求する機器が多種多様に発達し、より高エネルギー密度の電池が要望されている。さらに、機器が薄形化、小型化するにつれ電池も薄形化、小型化が要求される。

【0003】

そして、その要望に応えるべく、種々の新しい電池が提案されているが、特に、有機電解液電池は高エネルギー密度の為、研究開発、さらには商品化が近年盛んに行われている。

【0004】

しかしながら、この種の電池が長期に渡って安定に使用されるためには、電解液の漏出や大気中の水分の電池内への侵入による電池活物質や電解質等との反応が原因で生じる電池性能の低下を防止するため、気密性、液密性の両面から電池を完全密封する必要があり、極めて密閉性の高い封口がなされている。

【0005】

一方、この種の電池が高温に晒されたり、外部短絡又は電極やセパレータの劣化、形状変化等による内部短絡、或は外部電源による強制的な過大電流放電の発生により急激な温度上昇があった場合や、過大電圧による過充電がなされた場合に、有機電解液溶媒が揮発或は分解してガスが発生し、このガスが電池内に閉じ込められ、電池内圧が著しく上昇するため、電池ケースが膨張変形し、時として電池が破裂し、安全上重大な問題となる。

(5)

実開平5-84025

【0006】

このような問題を解決するため、従来この種の電池においては、ガス発生により電池内圧が上昇した時、危険な破裂に至る高圧になる前に電池ケース或は封口体に安全弁装置が設けられていた。代表的なものとして、図2に示すようにガラスシール或はセラミックシールなどの絶縁部材(23)を用いたハーメチック構造を採用し、一極性端子を兼ねる外装缶(21)と金属封口蓋(22)とをレーザー溶接等により溶着すると共に、他極性端子ピン(24)を絶縁部材(23)中に貫通固定するものがある。

【0007】

ところが、このような電池においてはその密閉性の高さゆえに誤使用や異常環境下で電池内圧が上昇すると外装缶が異常に膨れ、電池破裂の危険性がある。また、電池破裂を防ごうとし、電池内圧上昇時に絶縁部材(23)が破壊する構造なるものにしようとする、絶縁部材(23)と金属封口蓋(22)或は絶縁部材(23)と端子ピン(24)との密着性を弱めなければならないが、そうすると、電解液の漏液が発生する。

【0008】

そこで、電池の破裂を未然に防止するものとして、図3に示すように、外装缶(31)の底の一部を薄肉とすることで、電池内圧異常上昇時に薄肉部(32)が破れる構造を持たそうするものがある。しかしながら、この場合、薄肉部の厚みを管理するのが困難であり、作動圧設定が難しく、十分な安全性を得ることはできない。

【0009】

図4の電池構造はゴム弁体を安全弁に採用している電池構造要部である。上下より金属封口蓋(42)を絶縁パッキング(44)と絶縁パッキング(45)で挟み込み、中空リベット(43)を絶縁パッキングの貫通孔(50)に挿入し、これに下部より集電用ワッシャ(46)を挿入し、全体を縦方向に加圧して、中空リベットの脚先端を拡張してかしめる。

【0010】

次に、中空リベットの座にゴム弁体(49)を乗せ、上より端子キャップ(4

(6)

実開平5-84025

7) で加圧しながら端子キャップ(47)と中空リベットの座をスポット溶接する。以上のようにして蓋体(51)を得ている。本構造は特に圧力応答性の良好な安全弁を装着しうるものの、ゴム弁体と中空リベットの座との間に間隙ができやすく、外気中の水分が電池内に侵入し、電池活物質や電解質の劣化を促し、また、その間隙より電解液が漏れると言った耐リーク特性に問題がある。

【0011】

【考案が解決しようとする課題】

よって、圧力応答性の良好な安全弁装置を具備し、かつ、耐リーク特性に優れた有機電解液電池を得ることが課題となる。

【0012】

【課題を解決するための手段】

本考案は、発電要素を内蔵せる一極性端子兼用の外装缶と、該外装缶に導電的に固着され外装缶の開口部を閉塞する金属封口蓋と、絶縁部材を介して配置される他極性端子の中空リベットを付設する有機電解液電池において、該中空リベットの座に防爆用金属薄板を超音波により溶接してリベット穴を閉塞してなる安全弁装置を備えた有機電解液電池とすることにより前述の課題を解決するものである。

【0013】

この防爆用金属薄板を中空リベットの座に締着する方法は超音波溶接の他に、レーザー溶接、抵抗スポット溶接等がある。しかし、レーザー溶接は装置が高額で、また、溶接に時間がかかるため生産性に劣る。さらに、抵抗スポット溶接は単点スポットを狭いピッチで多点溶接する必要があり、生産性に劣り、また、溶接間隔に間隙ができるため耐リーク特性に問題がある。

【0014】

【作用】

本考案電池によれば、図1に示す圧力応答性の良好な安全弁装置を有するため誤使用等の異常時による電池の破裂がなく、安全性に優れている。また、中空リベット穴を防爆用金属薄板で閉塞しているため、耐リーク特性の向上が図れる。

【0015】

(7)

実開平5-84025

【実施例】

以下、本考案の実施例につき図面に基づき詳述する。

【0016】

図1は一実施例による有機電解液電池の要部断面図を示し、図1において(1)は負極端子兼用の外装缶で発電要素(図示せず)が内蔵されている。(2)は外装缶(1)の開口部に導電的に固着された金属封口蓋であって、両者の接合部はレーザー溶接により溶着されている。(3)は中空リベットであって、上下より金属封口蓋(2)を絶縁バックリング(4)と絶縁バックリング(5)で挟み込み、中空リベット(3)を絶縁バックリング(4)及び(5)の貫通孔(10)に挿入し、これに下部より集電用ワッシャ(6)を挿入し、全体を縦方向に加圧して中空リベット(3)の脚先端を拡張してかしめる。つぎに、電解液を中空リベットを通して注入した後、厚み $20\mu\text{m}$ のアルミ箔からなる防爆用金属薄板(9)を中空リベットの座に超音波にて溶着した。そして、端子キャップ(7)を防爆用金属薄板の上に装着した。以上のようにして電池を組立てた。

【0017】

尚、実施例では防爆用金属薄板をとして $20\mu\text{m}$ のアルミ箔板を用いたが、厚みが $7\mu\text{m}\sim 10\mu\text{m}$ のステンレス箔板、 $5\sim 10\mu\text{m}$ のニッケル箔板でも同様の特性が得られた。

【0018】

【考案の効果】

以上のことから、本考案によれば、圧力応答性の良好な安全弁装置を有し、且つ、耐リーク特性に優れた有機電解液電池を得ることができ、その実用的価値は極めて大である。

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CLAIMS

[Utility model registration claim]

[Claim 1] the metal lid which fixes a power generation element in electric conduction with the sheathing can and this sheathing can of built-in **** 1 polarity terminal combination, and blockades opening of a sheathing can, and the organic electrolytic-solution cell which it is arranged through insulating member, and also attaches the hollow rivet of a polar terminal -- it is -- the seat of this hollow rivet -- explosion protection -- public funds -- the safe valve gear of the organic electrolytic-solution cell characterized by putting group sheet metal firmly on and blockading a rivet hole

[Claim 2] the safe valve gear of an organic electrolytic-solution cell according to claim 1 -- it is -- explosion protection -- public funds -- the safe valve gear of the organic electrolytic-solution cell characterized by closing group sheet metal securely with ultrasonic welding

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TECHNICAL FIELD

[Industrial Application]

this invention relates to the explosion protection and safe structure over the time of the cell internal pressure rise in a short circuit, the time of fault charge and discharge, etc., or a cell temperature rise etc. especially about the square shape organic electrolytic-solution cell as a power supply for a drive of a portable device.

[0002]

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PRIOR ART

[Description of the Prior Art]

In recent years, a high current and the device which requires high power progress variously to the cell as a power supply like **, such as mobile communications devices, such as AV equipments, such as pocket information machines and equipment, such as a laptop computer and a word processor, a camcorder/movie, and a liquid crystal television, and a cellular phone, and the cell of high-energy density is demanded more. furthermore, a device -- the formation of a thin form -- it miniaturizes -- be alike and hang -- the formation of a thin form and a miniaturization are required also for a cell

[0003]

And although various new cells are proposed to meet the request, as for an organic electrolytic-solution cell, research and development are done, and, especially as for the further, commercialization is briskly performed in recent years for high-energy density.

[0004]

However, in order to prevent the cell performance degradation which a reaction with a cell active material, an electrolyte, etc. by exsorption of the electrolytic solution or invasion into the cell of the moisture in the atmosphere produces owing to in order to use this kind of cell stably over a long period of time, it is necessary to carry out full seal of the cell from both sides of airtightness and fluid-tight nature, and high obturation of sealing nature is made extremely.

[0005]

On the other hand, this kind of cell is exposed to an elevated temperature, or An external short circuit or degradation of an electrode and separator, The case where there is a rapid temperature rise by generating of the internal short circuit by configuration change etc., or the compulsory excessive current electric discharge by the external power, Since an organic electrolytic-solution solvent volatilizes or decomposes, gas occurs, this gas is shut up in a cell and cell internal pressure rises remarkably when the surcharge by excessive voltage is made, a cell case carries out expansion deformation, a cell sometimes explodes, and it becomes a serious problem on safe.

[0006]

Before becoming the high pressure which results in dangerous rupture in this kind of cell conventionally when cell internal pressure rises by the generation of gas in order to solve such a problem, the safe valve gear was formed in the cell case or the obturation object. While welding the sheathing can (21) and metal lid (22) which adopt the hermetic structure using insulating member (23), such as a glass seal or a ceramic seal, as a typical thing as shown in drawing 2 , and serve as a 1 polarity terminal by laser welding etc., it is insulating member (23) about another polarity terminal pin (24).

There are some which are transfixed to inside.

[0007]

However, when cell internal pressure rises under the height, therefore misuse of the sealing nature, or unusual environment in such a cell, a sheathing can blisters unusually and there is danger of a cell burst. moreover, it is going to prevent a cell burst and insulating member (23) breaks at the time of a cell internal pressure rise -- structure -- if it is going to make it a thing, although the adhesion of insulating member (23), a metal lid (22) or insulating member (23), and a terminal pin (24) must be weakened, if it does so, a liquid spill of the electrolytic solution will occur

[0008]

Then, it is a thin-walled part (32) as what prevents rupture of a cell beforehand at the time of cell internal pressure unusual elevation by using a part of bottom of a sheathing can (31) as thin meat, as shown in drawing 3 .

There is a thing which will give ***** and to carry out. However, it is difficult to manage the thickness of a thin-walled part in this case, a working-pressure setup is difficult, and sufficient safety cannot be obtained.

[0009]

The cell structure of drawing 4 is a cell structure important section which has adopted the rubber valve element as a relief valve. the upper and lower sides -- a metal lid (42) -- insulating packing (44) and insulating packing (45) -- putting -- a hollow rivet (43) -- the breakthrough (50) of insulating packing -- inserting -- this -- the lower part -- the washer for current collection (46) -- inserting -- the whole -- lengthwise -- pressurizing -- the foot nose of cam of a hollow rivet -- extending -- it closes

[0010]

Next, a rubber valve element (49) is put on the seat of a hollow rivet, and spot welding of the seat of a hollow rivet is carried out to a cover-distributor end (47), pressurizing by the cover-distributor end (47) from a top. The lid (51) has been obtained as mentioned above. Although this structure can equip with a relief valve especially with good pressure responsibility, a gap tends to be made between a rubber valve element and the seat of a hollow rivet, the moisture in the open air invades in a cell, and degradation of a cell active material and an electrolyte is urged to it, and a problem is in the leak-proof property said that the electrolytic solution leaks from the gap.

[0011]

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EFFECT OF THE INVENTION

[Effect of the Device]

Being able to obtain the organic electrolytic-solution cell which has a safe valve gear with good pressure responsibility, and was excellent in the leak-proof property from the above thing according to this design, the practical value is size very much.

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TECHNICAL PROBLEM

[Problem(s) to be Solved by the Device]

Therefore, it becomes a technical problem to obtain the organic electrolytic-solution cell which possessed the safe valve gear with good pressure responsibility, and was excellent in the leak-proof property.

[0012]

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DETAILED DESCRIPTION

[Detailed explanation of a design]

[0001]

[Industrial Application]

this invention relates to the explosion protection and safe structure over the time of the cell internal pressure elevation in a short circuit, the time of fault charge and discharge, etc., or a cell temperature rise etc. especially about the square shape organic electrolytic-solution cell as a power supply for a drive of a portable device.

[0002]

[Description of the Prior Art]

In recent years, a high current and the device which requires high power progress variously to the cell as a power supply like **, such as mobile communications devices, such as AV equipments, such as pocket information machines and equipment, such as a laptop computer and a word processor, a camcorder/movie, and a liquid crystal television, and a cellular phone, and the cell of high-energy density is demanded more. furthermore, a device -- the formation of a thin form -- it miniaturizes -- be alike and hang -- the formation of a thin form and a miniaturization are required also for a cell

[0003]

And although various new cells are proposed to meet the request, as for an organic electrolytic-solution cell, research and development are done, and, especially as for the further, commercialization is briskly performed in recent years for high-energy density.

[0004]

However, in order to prevent the cell performance degradation which a reaction with a cell active material, an electrolyte, etc. by exsorption of the electrolytic solution or invasion into the cell of the moisture in the atmosphere produces owing to in order to use this kind of cell stably over a long period of time, it is necessary to carry out full seal of the cell from both sides of airtightness and fluid-tight nature, and high obturation of sealing nature is made extremely.

[0005]

On the other hand, this kind of cell is exposed to an elevated temperature, or An external short circuit or degradation of an electrode and separator, The case where there is a rapid temperature rise by generating of the internal short circuit by configuration change etc., or the compulsory excessive current electric discharge by the external power, Since an organic electrolytic-solution solvent volatilizes or decomposes, gas occurs, this gas is shut up in a cell and cell internal pressure rises remarkably when the surcharge by excessive voltage is made, a cell case carries out expansion deformation, a cell sometimes explodes, and it becomes a serious problem on safe.

[0006]

Before becoming the high pressure which results in dangerous rupture in this kind of cell conventionally when cell internal pressure rises by the generation of gas in order to solve such a problem, the safe valve gear was formed in the cell case or the obturation object. While welding the sheathing can (21) and metal lid (22) which adopt the hermetic structure using insulating member (23), such as a glass seal or a ceramic seal, as a typical thing as shown in drawing 2 , and serve as a 1 polarity terminal by laser welding etc., it is insulating member (23) about another polarity terminal pin (24).

There are some which are transfixed to inside.

[0007]

However, when cell internal pressure rises under the height, therefore misuse of the sealing nature, or unusual environment in such a cell, a sheathing can blisters unusually and there is danger of cell rupture.

moreover, it is going to prevent cell rupture and insulating member (23) breaks at the time of cell internal pressure elevation -- structure -- if it is going to make it a thing, although the adhesion of insulating member (23), a metal lid (22) or insulating member (23), and a terminal pin (24) must be weakened, if it does so, a liquid spill of the electrolytic solution will occur

[0008]

Then, it is a thin-walled part (32) as what prevents rupture of a cell beforehand at the time of cell internal pressure unusual elevation by using a part of bottom of a sheathing can (31) as thin meat, as shown in drawing 3.

There is a thing which will give ***** and to carry out. However, it is difficult to manage the thickness of a thin-walled part in this case, a working-pressure setup is difficult, and sufficient safety cannot be obtained.

[0009]

The cell structure of drawing 4 is a cell structure important section which has adopted the rubber valve element as a relief valve. the upper and lower sides -- a metal lid (42) -- insulating packing (44) and insulating packing (45) -- putting -- a hollow rivet (43) -- the breakthrough (50) of insulating packing -- inserting -- this -- the lower part -- the washer for current collection (46) -- inserting -- the whole -- lengthwise -- pressurizing -- the foot nose of cam of a hollow rivet -- extending -- it closes

[0010]

Next, a rubber valve element (49) is put on the seat of a hollow rivet, and spot welding of the seat of a hollow rivet is carried out to a cover-distributor end (47), pressurizing by the cover-distributor end (47) from a top. The lid (51) has been obtained as mentioned above. Although this structure can equip with a relief valve especially with good pressure responsibility, a gap tends to be made between a rubber valve element and the seat of a hollow rivet, the moisture in the open air invades in a cell, and degradation of a cell active material and an electrolyte is urged to it, and a problem is in the leak-proof property said that the electrolytic solution leaks from the gap.

[0011]

[Problem(s) to be Solved by the Device]

Therefore, it becomes a technical problem to obtain the organic electrolytic-solution cell which possessed the safe valve gear with good pressure responsibility, and was excellent in the leak-proof property.

[0012]

[Means for Solving the Problem]

In the metal lid which this design fixes a power generation element in electric conduction with the sheathing can and this sheathing can of built-in **** 1 polarity terminal combination, and blockades opening of a sheathing can, and the organic electrolytic-solution cell which it is arranged through insulating member, and also attaches the hollow rivet of a polar terminal the seat of this hollow rivet -- explosion protection -- public funds -- group sheet metal is welded according to an ultrasonic wave, and the above-mentioned technical problem is solved by considering as the organic electrolytic-solution cell equipped with the safe valve gear which comes to blockade a rivet hole

[0013]

Other than ultrasonic welding, the method of putting this sheet metal for explosion protection firmly on the seat of a hollow rivet has laser welding, resistance spot welding, etc. However, equipment is a large sum and, for this reason, laser welding is inferior to welding in time at productivity. Furthermore, since resistance spot welding needs to carry out multipoint welding of the single point spot in a narrow pitch, and is inferior to productivity and a gap is made as for it to a welding interval, a problem is in a leak-proof property.

[0014]

[Function]

According to this cell, since it has a safe valve gear with the good pressure responsibility shown in drawing 1, there is no rupture of the cell by the time of abnormalities, such as misuse, and it excels in safety. moreover, a hollow rivet hole -- explosion protection -- public funds -- since it blockades with group sheet metal, improvement in a leak-proof property can be aimed at

[0015]

[Example]

Hereafter, based on a drawing, it explains in full detail per example of this design.

[0016]

Drawing 1 shows the important section cross section of the organic electrolytic-solution cell by one

example, and, as for (1), the power generation element (not shown) is built in with the sheathing can of negative-electrode terminal combination in drawing 1. (2) is the metal lid which fixed in electric conduction to opening of a sheathing can (1), and both joint is welded by laser welding. (3) -- a hollow rivet -- it is -- the upper and lower sides -- a metal lid (2) -- insulating packing (4) and insulating packing (5) -- putting -- a hollow rivet (3) -- insulating packing (4) and the breakthrough (10) of (5) -- inserting -- this -- the lower part -- the washer for current collection (6) -- inserting -- the whole -- lengthwise -- pressurizing -- the foot nose of cam of a hollow rivet (3) -- extending -- it closes the explosion protection which next consists of aluminum foil with a thickness of 20 micrometers after pouring in the electrolytic solution through a hollow rivet -- public funds -- group sheet metal (9)
 It welded [of the ***** rivet] ultrasonically. and a cover-distributor end (7) -- explosion protection -- public funds -- it equipped on group sheet metal The cell was assembled as mentioned above.

[0017]

in addition -- an example -- explosion protection -- public funds -- group sheet metal -- ** -- although it carried out and the 20-micrometer aluminum foil board was used, the same property was acquired also by stainless steel ***** whose thickness is 7 micrometers - 10 micrometers, and nickel ***** which is 5-10 micrometers

[0018]

[Effect of the Device]

Being able to obtain the organic electrolytic-solution cell which has a safe valve gear with good pressure responsibility, and was excellent in the leak-proof property from the above thing according to this design, the practical value is size very much.

[Translation done.]

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MEANS

[Means for Solving the Problem]

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Other than ultrasonic welding, the method of putting this sheet metal for explosion protection firmly on the seat of a hollow rivet has laser welding, resistance spot welding, etc. However, equipment is a large sum and, for this reason, laser welding is inferior to welding in time at productivity. Furthermore, since resistance spot welding needs to carry out multipoint welding of the single point spot in a narrow pitch, and is inferior to productivity and a gap is made as for it to a welding interval, a problem is in a leak-proof property.

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OPERATION

[Function]

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[0015]

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EXAMPLE

[Example]

Hereafter, based on a drawing, it explains in full detail per example of this design.

[0016]

Drawing 1 shows the important section cross section of the organic electrolytic-solution cell by one example, and, as for (1), the power generation element (not shown) is built in with the sheathing can of negative-electrode terminal combination in drawing 1. (2) is the metal lid which fixed in electric conduction to opening of a sheathing can (1), and both joint is welded by laser welding. (3) -- a hollow rivet -- it is -- the upper and lower sides -- a metal lid (2) -- insulating packing (4) and insulating packing (5) -- putting -- a hollow rivet (3) -- insulating packing (4) and the breakthrough (10) of (5) -- inserting -- this -- the lower part -- the washer for current collection (6) -- inserting -- the whole -- lengthwise -- pressurizing -- the foot nose of cam of a hollow rivet (3) -- extending -- it closes the explosion protection which next consists of aluminum foil with a thickness of 20 micrometers after pouring in the electrolytic solution through a hollow rivet -- public funds -- group sheet metal (9)

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[0018]

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is the important section cross section of an organic electrolytic-solution cell to the example of this design.

[Drawing 2] The important section cross section of the conventional organic electrolytic-solution cell.

[Drawing 3] The important section cross section of the conventional organic electrolytic-solution cell.

[Drawing 4] The important section cross section of the conventional organic electrolytic-solution cell.

[Description of Notations]

- 1 Sheathing Can
- 2 Metal Lid
- 3 Hollow Rivet
- 4 Up Insulation Packing
- 5 Lower Insulation Packing
- 6 Washer for Current Collection
- 7 Cover-distributor End
- 8 Degassing Ko
- 9 Explosion Protection Which Consists of Aluminum Foil with a Thickness of 20 Micrometers -- Public Funds -- Group Sheet Metal
- 10 Penetration Mouth
- 21 Sheathing Can
- 22 Metal Lid
- 23 Insulating Member, Such as Glass or Ceramic Seal
- 24 Terminal Pin
- 31 Sheathing Can
- 32 Thin-walled Part
- 41 Sheathing Can
- 42 Metal Lid
- 43 Hollow Rivet
- 44 Insulating Packing
- 45 Insulating Packing
- 46 Washer for Current Collection
- 47 Cover-distributor End
- 48 Mold-Gassing Ko
- 49 Rubber Valve Element
- 50 Penetration Mouth
- 51 Lid

[Translation done.]

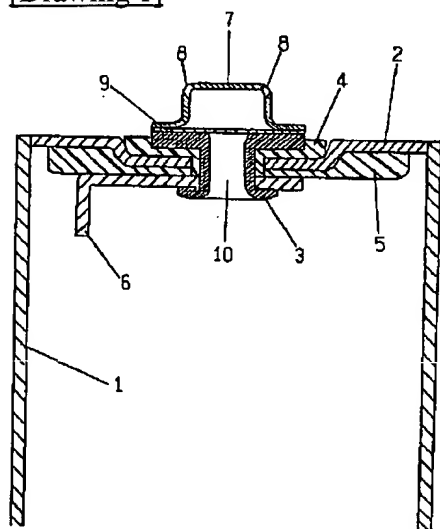
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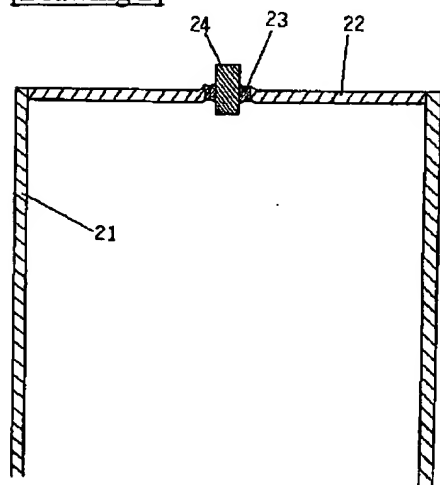
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DRAWINGS

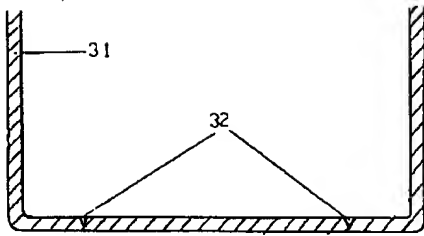
[Drawing 1]



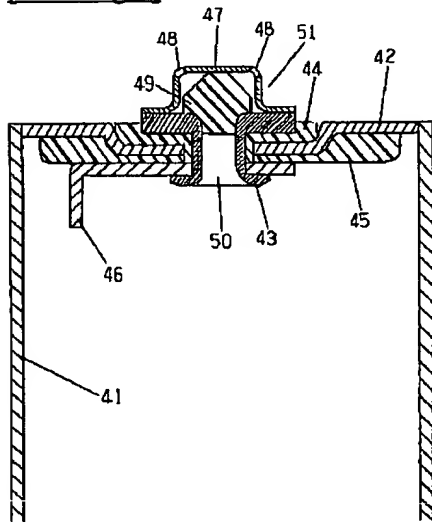
[Drawing 2]



[Drawing 3]

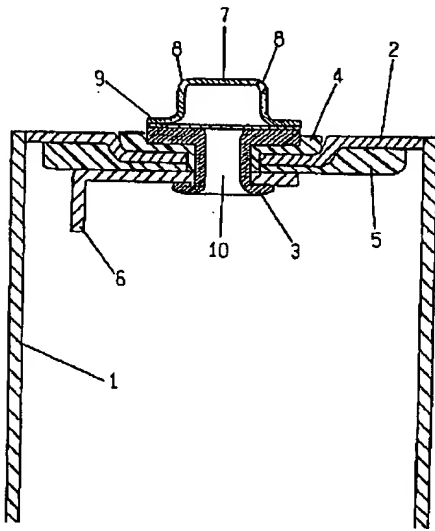


[Drawing 4]



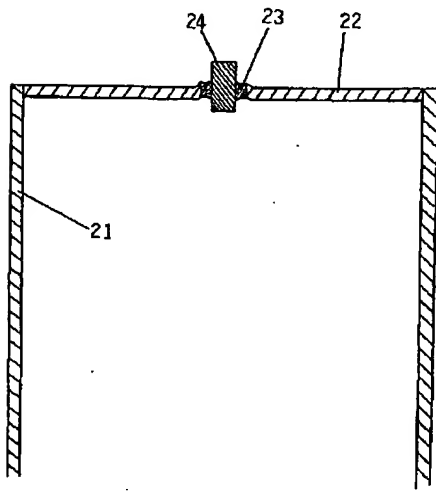
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Drawing selection



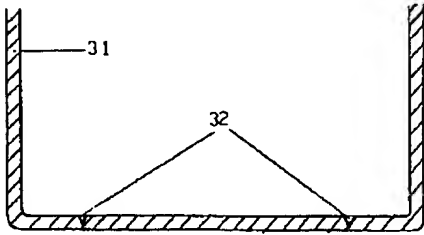
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Drawing selection ▼



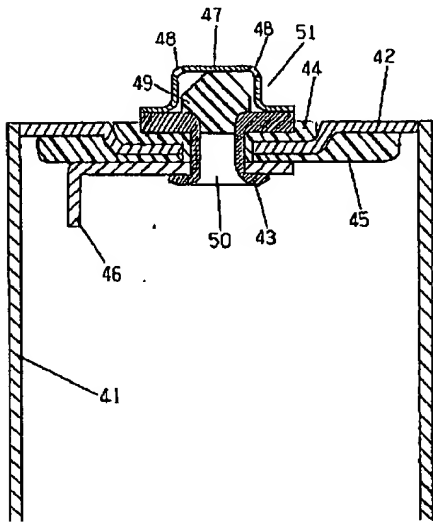
[Translation done.]

Drawing selection



[Translation done.]

Drawing selection ▼



[Translation done.]